

Research Article

Problems of Atmosphere Pollution in Cities with Carcinogenic Mutagen Supertoxins

Abbas Alwi Sakhir Abed^{a*}^aUniversity of AL_Qadissiyah (Iraq) College of Engineering, Department of Mechanical Engineering

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Abstract

The urgent problems of atmosphere pollution in cities with carcinogenic supertoxins are considered. On the basis of experimental data, the total levels of carcinogenicity of exhaust gases at application of various fuels including higharomatic fuels are analysed. The integral indices of carcinogenic danger caused by vehicles are presented and their comparison with admissible European standards is carried out.

Keywords: motor transport, fuels, aromatic hydrocarbons, exhaust gases, nitric oxides, particulate pollutant, carcinogenic hydrocarbons, benzo(a)pyrene, ecological indices.

Introduction

Among all the global problems, which have been ever solved by mankind, the most difficult have been problems of food and energy production. In recent decades one super problem was added to them, which chiefly belongs to ecology – environmental (E) pollution, especially pollution of the urban atmosphere by carcinogenic and mutagenic toxins (Luch A et al,2005; Seminogenko V.P et al,2003). Among ingredients, which occur in the E during human activities, there is a series of compounds, which is characterized by high chemical stability and which is extreme dangerous for all creatures on the Earth, primarily for human beings. These reagents belong to a category of persistent organic pollutants (POP). The most eodangerous are polycyclic aromatic hydrocarbons (PAH), firstly carcinogenic hydrocarbons (CH). PAH consist of hundreds of chemical compounds, including such PAH derivatives as PAH with NO₂ group (nitroPAH), having even stronger mutagenic properties and heterocyclic aromatic compounds. Accumulated data shows that extreme low concentration of CH can promote progress of diseases of immune and reproductive systems, appearance of carcinomas, birth defects among children etc. Presence of just several molecules of such compounds is able to promote carcinogenic and mutagenic effects in the living body.

Publication analysis

Consequences of the extreme dangerous influence of the noted compounds on public health exacerbate year by

year. Hence attention to the issue of carcinogenic and mutagenic environmental pollution in the world constantly grows, but unfortunately presence of these compounds grows faster (Chaclin A.V et al,1996; Gennadiev A.N et al,2003). Stockholm Convention, which was signed by Ukraine as early as in 2001 and its impact started in 2004, aims to health and E protection from POP and focuses on reducing the levels of carcinogenic contained emissions and their liquidation (Mischenko V.S. et al,2005).

Purpose and statement

In spite of a variety of PAH (by now it is about 500 have been identified), a series of top priority groups has been emphasized, among them 16 PAH, including benzo(a)pyrene (BP), defined by United States Environmental Protection Agency to provide the measured data (US EPA, 1988); 4 PAH (benzo(b)fluoranten, benzo(k)fluoranten, benzo(a)pyrene, indeno(1,2,3cd)pyrene, which ought to be used as indicators for the emission inventory within PAH UNECE protocol. Then to analyze of carcinogenicity of exhaust gases (EG) of internal combustion engines (ICE), scientists and experts have defined a PAH priority group, including 12 PAH with different relative carcinogenic activity indexes (CAI). The PAH priority group for analyzing carcinogenicity EG ICE includes: benzo(a)pyrene (C₂₀H₁₂, CAI = 1,0); benzo(b)fluoranthene (CAI = 0,1); ben(a)anthracene, chrysene, benzo(g,h,i)perylene (CAI = 0,01); fluoranthene, pyrene, benzo(e)pyrene, perylene, indenopyrene, diben(a,h)anthracene, coronene (CAI < 0,01).

Among heavy (polycyclic) PAH, BP is the first studied and the most analyzed. That is why the most information

*Dr Abbas Alwi Sakhir Abed is working as Asst. Prof.